

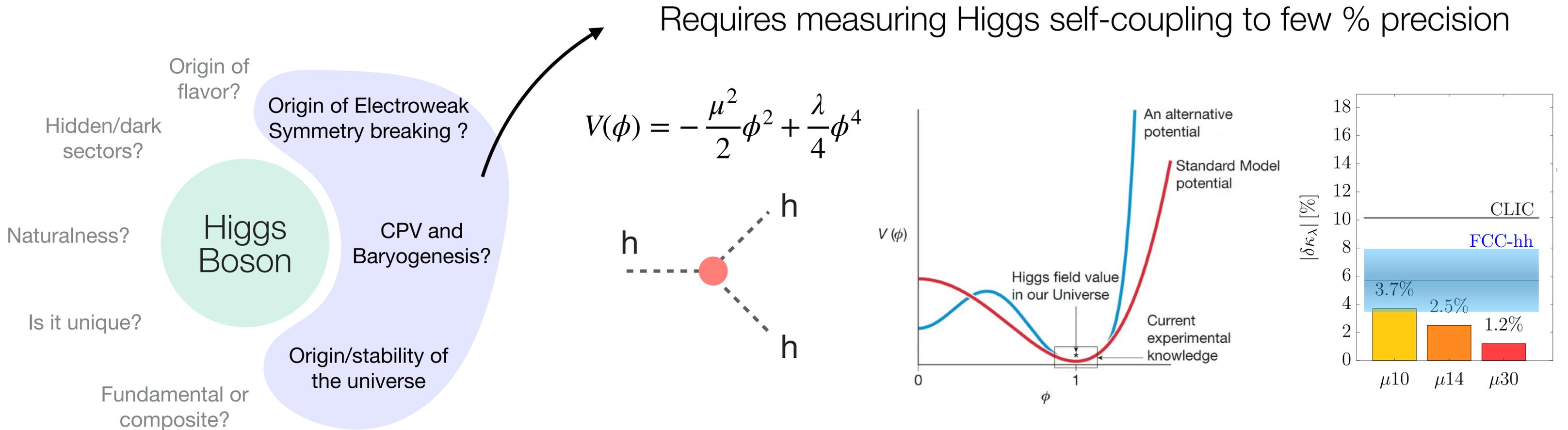
The need for 10 TeV

Snowmass Higgs
Forum Report
2209.07510

The Higgs Boson
Turns Ten
2207.00478

Not pictured: Dark
Matter Complementarity
2211.07027

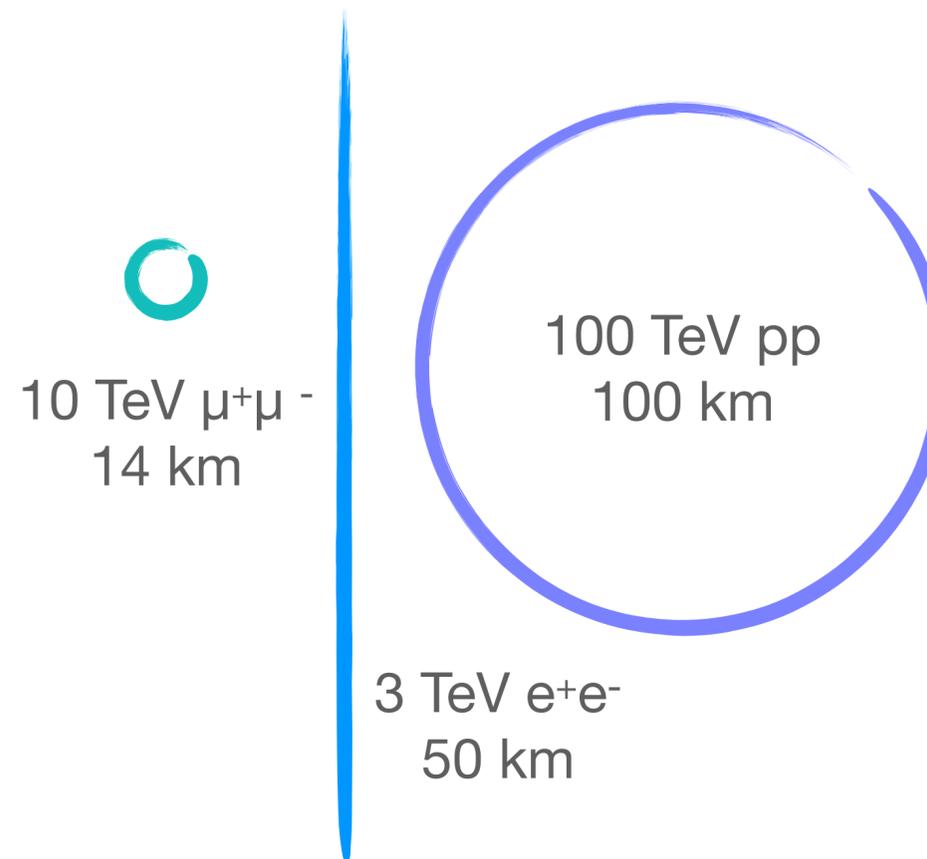
The Higgs is central to most fundamental questions in particle physics
Colliders = only tool for studying the microscopic nature of the Higgs and Higgs potential



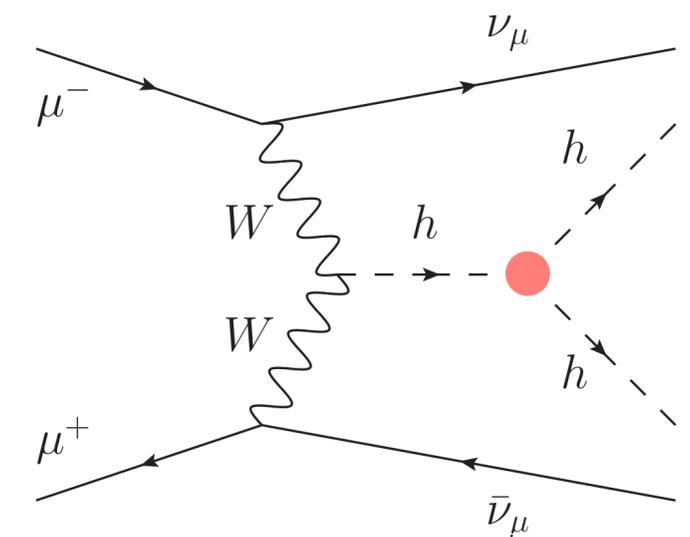
Producing enough multi-Higgs events is only possible at 10 TeV scale collider

Breaks the paradigm of larger and larger e^+e^- and pp colliders Muons add unique physics opportunities & are natural fit for Fermilab

- Energy reach: 10 TeV $\mu^+\mu^-$ similar to 100 TeV pp collider
- Compact and power efficient: no synchrotron radiation ($1/m^4$)
- Luminosity improves with energy
- Physics on the way to 10 TeV
- Synergy with neutrinos and flavor
- Recent technology advances
- Many opportunities for innovation
- No fundamental show-stoppers

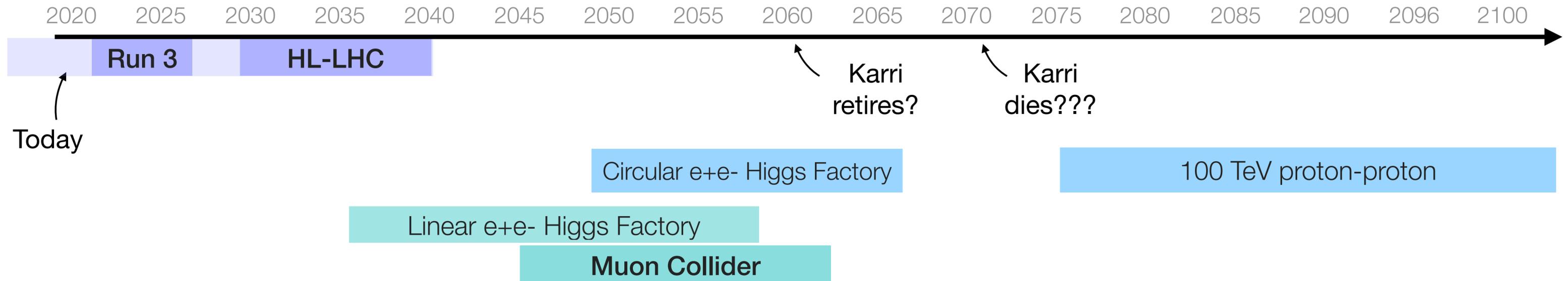


More than just a lepton collider
also vector boson collider



a 10 TeV Muon Collider would fit within Fermilab site
& build on proton accelerator complex

Physics case for 10 TeV has strengthened since Higgs Discovery
Key technologies are becoming available → only possible path to 10 TeV in our lifetimes
Strong desire to bring the energy frontier back to the US



Give early career physicists the opportunity to make a 10 TeV Muon Collider a reality
Modest ask: support R&D and design development so we can make the big ask
at the next P5 with progress in hand